

# **CD5220**

*Liquid Crystal  
Customer Display  
**User's manual***

# ***CD5220 customer display***

## **INDEX**

<b>1. FEATURES</b>	<b>2</b>
<b>2. TYPE CLASSIFICATION</b>	<b>3</b>
<b>3. GENERAL SPECIFICATION</b>	<b>4</b>
<b>4. INTERFACE SPECIFICATION</b>	<b>6</b>
<b>5. FUNCTION SELECTION</b>	<b>12</b>
<b>6. COMMAND</b>	<b>14</b>
<b>7. INSTALLATION GUIDE</b>	<b>23</b>

# ***CD5220 customer display***

## **1. FEATURES**

- Data can be displayed on 15 columns x3 lines.
- Blue-green fluorescent color and large character are easy to read.
- The display panel is adjustable to provide the best view angle.
- Provide 2 pole for bast position installation.
- The DIP switch setting emulate commands mode
- CD5220/UTC/AEDEX/ADM787/ADM788/EscPOS/DSP-800 emulation command set, selected by DIP switch or control utility software.
- User-defined characters can be downloaded. (for CD5220/DSP-860/EPSON command mode)
- A code-generated software is provided for customer, and download his own character to the display (and save to EEPROM,EEPROM is option).
- International character set is selectable.
- User-defined message can be downloaded to display. (DSP-800 only)
- Display area can be controlled by window function. (EPSON only)
- Provides an interface based on RS-232C or centronics ,And RS232C baud rate 4800,9600 BPS select by DIP switch , (or setting by software from 300 to 19200bps, EEPROM option)
- Both printer and display can be connected to the same port .

# ***CD5220 customer display***

## **2. TYPE CLASSIFICATION**

**CD5220 - S T 12 N PT**

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I            II            III            IV            V            VI

No	Type name	Type name	Description
<b>I</b>	Mode No.	<b>CD5220</b>	CD5220 display
		<b>CD6220</b>	CD6220 display
<b>II</b>	Interface	<b>S</b>	Serial port(RS232c)
		<b>P</b>	Parallel port(Centronics)
<b>III</b>	Base section	<b>T</b>	Rectangle base
		<b>C</b>	Circular base
<b>IV</b>	Power input	<b>05</b>	DC5V
		<b>12</b>	DC12V
		<b>24</b>	DC24V
<b>V</b>	Power adaptor	<b>N</b>	no adapter
		<b>110</b>	AC110V adapter
		<b>EU</b>	AC230V adapter with EU power core
		<b>UK</b>	AC230V adapter with UK power core
		<b>B</b>	power bracket for PC
<b>VI</b>	Pass through function	<b>PT</b>	With pass through function
			Without pass through function

## **CD5220 customer display**

### **3. GENERAL SPECIFICATIONS**

<b>NO</b>	<b>ITEM</b>		<b>CD5220</b>	<b>CD6220</b>
1	Display method		Vacuum fluorescent display	
2	Number of character		40 characters ( 20 columns x 2 lines)	
3	Display color		blue green	
4	Brightness		700 cd/m2	850 cd/m2
5	Character type		96 alphanumeric 13 kinds of international character set 1 kind of user define character	
6	Character font		5 x 7 dot matrix	
7	Character size		9.2mm x 6.4mm	11.2mm x 6.4mm
8	Character pitch		8.3mm	9.9mm
9	Power supply		5VDC/12VDC/24VDC	
10	Power consumption		5W/4.5W/4.5W	
11	MTBF-power on time		25000 hours	25000 hours
12	Dimensions	panel	226/Wx92/Hx50/D mm	260/Wx100/Hx64/D mm
		support	231 mm,90 mm,231+90 mm	
		base	rectangle base : 217.5(w)x82(h)x106(d)mm circular base : 50(h)x70(r)mm	

## ***CD5220 customer display***

<b>NO</b>	<b>ITEM</b>	<b>CD5220</b>	<b>CD6220</b>	
13	Viewing angle	8 - 35 degrees	-5 ~ 35 degrees	
14	Rotation angle	Maximum 270 degrees		
15	Weight	0.92 Kg	1.08 Kg	
16	Environmental Condition	temperature Operating : 5 - 45 C Storage 30%-85%	Humidity -10 - 55 C 30%-85%	
17	Applicable standards	FCC class A 、 CE		

Table 3-1

# ***CD5220 customer display***

## **4. INTERFACE SPECIFICATIONS**

### **4.1 Communication**

#### **4.1.1 Serial port (RS232C) communication**

(a) The interface specification are based on EIA RS232C baud rate 9600 or 4800 bps ( select by DIP switch, refer Table 4-7) 8 data bits, none parity, 1 or more stop bits

(b) Serial port (RS232C) communication flow

    1. Data flow : PC/host to display, display to printer, printer to PC/host

    2. Control flow : display to PC/host, printer to display, PC/host to printer

(c) CD5220/CD6220 will inactive DTR or RTS signal to PC/host, the following two condition.

    1. Printer inactive DTR or RTS signal.

    2. The pass through buffer in CD5220/CD6220 is full ( 200bytes ) .

\* If PC/host keep transmitting the data to printer when CD5220/CD6220 inactive DTR or RTS , data will be lost.

#### **4.1.2 Parallel port (Centronic) communication**

(a) data flow : PC/Host to display, display to printer

(b) control flow : printer to display , display to PC/Host

(c) When data has been transmitted to printer by parallel port interface, the CD5220/CD6220 response the printer status to PC/Host, When printer active the BUSY signal, CD5220/CD6220 will keep accept the data until the

## ***CD5220 customer display***

buffer is full, (the buffer size is 200 bytes), then active the BUSY signal to PC/host.

### **4.2 Serial port interface for rectangle basic section**

(a) Serial port interface connector position for rectangle basic section

## ***CD5220 customer display***

(b) Power input

Connector type : DC JACK (5.5/2.1)

(c) RS232C to PC/HOST connector pin assignment

Connector type : D-sub 25 pin (Female)

No	Signal	direction	Function description
1	FG	-	Frame ground
2	TXD	From printer to PC/Host	Printer status data
3	RXD	From PC/Host to display	Receive data
4	RTS	From display to PC/Host	Display/print ready signal
5	CTS	From PC/Host to printer	PC/Host ready signal
6	DSR	From PC/Host to printer	PC/Host ready signal
7	GND	-	Signal ground
16	V+	Input(optional)	If using power built-in
20	DTR	From display to PC/Host	Display/print ready signal

Table 4-1

(d) RS232C to printer connector pin assignment

Connector type : D-sub 9 pin (Male)

No	Signal	direction	Function description
2	RXD	From printer to PC/Host	Printer status data
3	TXD	From display to printer	Transmit data
4	DTR	From PC/Host to printer	PC/Host ready signal
5	GND	-	Signal ground
6	DSR	From printer to display	Printer ready signal
7	RTS	From PC/Host to printer	PC/Host ready signal
8	CTS	From printer to display	Printer ready signal

Table 4-2

## **CD5220 customer display**

### **4.1.3 Serial port interface for circular base**

(a) Power connector of Power cable

Connector type : DC jack (5.5/2.1 )

(b) RS232C interface to PC/HOST cable,

PC/HOST side connector pin assignment

Connector type : D-sub 9 pin (Female)

No	Signal	direction	Function description
1	FG	-	Frame ground
2	TXD	From printer to PC/Host	Printer status data
3	RXD	From PC/Host to display	Receive data
4	DSR	From PC/Host to printer	PC/Host ready signal
5	GND	-	Signal ground
6	DTR	From display to PC/Host	Display/printer ready signal
7	CTS	From PC/Host to printer	PC/Host ready signal
8	RTS	From display to PC/Host	Display/printer ready signal

Table 4-3

(c) RS232C interface to printer cable,

printer side connector pin assignment

Connector type : D-sub 25 pin (Male)

No	Signal	direction	Function description
2	RXD	From printer to PC/Host	Printer status data
3	TXD	From display to printer	Transmit data
4	CTS	From printer to display	Printer ready signal
5	RTS	From PC/Host to printer	PC/Host ready signal
6	DTR	From PC/Host to printer	PC/Host ready signal
7	GND	-	Signal ground
20	DSR	From printer to display	Printer ready signal

Table 4-4

## **CD5220 customer display**

### **4.3 Parallel port (Centronic) interface for circular base**

(a) Power connector of Power cable

Connector type : DC jack (5.5/2.1 )

(b) Parallel interface to PC/HOST cable,

PC/HOST side connector pin assignment

Connector type : D-sub 25 pin (Male)

No	Signal Name	Direction	Function description
1	/STB	Input	Strobe signal to read data
2-9	Data0 - Data7	Input	Parallel signal data
10	/ACK	Output	Data request signal
11	BUSY	Output	BUSY state from the display
12	PE	Output	Always negative logic
13	SELECT	Output	Always positive logic
15	/ERROR	Output	Always positive logic

Table 4-5

(c) Parallel interface to Printer cable,

Printer side connector pin assignment

Connector type : D-sub 25 pin (Female)

No.	Signal Name	Direction	Function description
1	/STB	output	strobe signal to write data
2-9	Data0-Data7	output	parallel signal data
11	BUSY	input	BUSY state from the printer
14	AUTFEED	output	Always positive logic
16	RESET	output	Always positive logic
17	SELE_IN	output	Always positive logic

Table 4-6

## ***CD5220 customer display***

# **CD5220 customer display**

## **5. FUNCTION SELECTION**

### **5.1 Baud rate**

<b>SW number</b>	<b>SW1</b>	<b>Function description</b>	<b>Baud rate ( bps )</b>
	OFF		9600
	ON		4800

Table 5-1

**notes:** SW1 is ignores when baud rate is store to EEPROM (EEPROM type only),

baud rate will be refer the EEPROM baud rate status.

### **5.2 International character set**

<b>SW number</b>				<b>Function description</b>	
SW2	SW3	SW4	SW5	International character set(code 20H-7FH)	Code table (code 80H-FFH)
OFF	OFF	OFF	OFF	U.S.A.	PC-437 (USA,standard Europe)
ON	OFF	OFF	OFF	FRANCE	PC-850(multilingual)
OFF	ON	OFF	OFF	GERMANY	PC-850(multilingual)
ON	ON	OFF	OFF	U.K.	PC-850(multilingual)
OFF	OFF	ON	OFF	DENMARK I	PC-850(multilingual)
ON	OFF	ON	OFF	SWEDEN	PC-850(multilingual)
OFF	ON	ON	OFF	ITALY	PC-850(multilingual)
ON	ON	ON	OFF	SPAIN	PC-850(multilingual)
OFF	OFF	OFF	ON	JAPAN	Katakana
ON	OFF	OFF	ON	NORWAY	PC-850(multilingual)
OFF	ON	OFF	ON	DENMARK II	PC-850(multilingual)
ON	ON	OFF	ON		SLAVONIC
OFF	OFF	ON	ON		RUSSIA
ON	OFF	ON	ON		Factory define
OFF	ON	ON	ON		Factory define
ON	ON	ON	ON		User define pattern

## ***CD5220 customer display***

Table 5-2

### **5.3 Command type select**

SW number			Function description	Software defined
SW6	SW7	SW8	Command type	Hex code
OFF	OFF	OFF	CD5220	07
ON	OFF	OFF	UTC/S	06
OFF	ON	OFF	UTC/P	05
ON	ON	OFF	AEDEX	04
OFF	OFF	ON	ADM 787	03
ON	OFF	ON	ADM 788	02
OFF	ON	ON	ESC/pos	01
ON	ON	ON	DSP800	00

Table 5-3

# **CD5220 customer display**

## **6. COMMAND**

### **6.1 CD5220 standard mode command list**

<b>Command</b>	<b>Code description(hex)</b>	<b>Function description</b>
ESC DC1	1B 11	overwrite mode
ESC DC2	1B 12	vertical scroll mode
ESC DC3	1B 13	horizontal scroll mode
ESC Q A .....CR	1B 51 41 [n ]x20 0D	set the string display mode, write string to upper line
ESC Q B .....CR	1B 51 42 [n ]x20 0D	set the string display mode, write string to lower line
ESC Q D .....CR	1B 51 44 [n ]xm 0D m<40	upper line message scroll continuously
ESC [ D	1B 5B 44	move cursor left
BS	08	move cursor left
ESC [ C	1B 5B 43	move cursor right
HT	09	move cursor right
ESC [ A	1B 5B 41	move cursor up
ESC [ B	1B 5B 42	move cursor down
LF	0A	move cursor down
ESC [ H	1B 5B 48	move cursor to home position
HOM	0B	move cursor to home position
ESC [ L	1B 5B 4C	move cursor to left-most position
CR	0D	move cursor to left-most position
ESC [ R	1B 5B 52	move cursor to right-most position
ESC [ K	1B 5B 4B	move cursor to bottom position
ESC 1 x y	1B 6C x y 1<=x<=20,y=1,2	move cursor to specified position
ESC @	1B 40	initialize display
ESC W s x1 x2 y	1B 57 1 x1 x2 y 1<=x1<=x2<=20 y=1,2	set or cancel the window range at horizontal scroll mode

# CD5220 customer display

<b>Command</b>	<b>Code description (hex)</b>	<b>Function description</b>
CLR	0C	clear display screen , and clear string mode
CAN	18	clear cursor line, and clear string mode
ESC * n	1B 2A n 1<=n<=4	brightness adjustment
ESC & s n m [a (p1..pa)]x (m-n+1)	1B 26 1 n m [a(p1..pa)]x (m-n+1) 20< n <= m <= FF	define download characters. a=1-5 p1..p5 =row1..row5
ESC ?	1B 3F	delete download characters.
ESC %	1B 25	select/cancel download character set.
ESC _ n	1B 5F n n=0,1	set cursor ON/OFF
ESC f n	1B 66 n	select international fonts set
ESC c n	1B 63 n	select fonts ,ASCII code or JIS code
ESC = n	1B 3D n n=1,2,3,31,32,33	select peripheral device, Display or Printer
ESC s 1	1B 73 01	store the use define character into EEPROM
ESC d 1	1B 64 01	store the use define character from EEPROM

Table 6-1

**(REMARK)\*** While using command "ESC QA" or "ESC QB", these two commands could use combine with terminal printer -- TP 2688.or TP3688

\* If using commands "ESC QA" or "ESC QB" ,others commands can not be used except using command "CLR" or "CAN" to change operating mode.

\* If using commands "ESC QD" ,upper line message move continuously, till receive a new command, and clear upper line and move cursor to upper line left-most position.

Set international font set( Table 6-2)  
6-3)

Select code table(Table

n	international font set	n	international font set
A	U.S.A.	N	NORWAY

n	international font set
A	compliance with ASCII code

# CD5220 customer display

G	GERMANY	W	SWEDEN	J	compliance with JIS code
I	ITALY	D	DENMARK I	R	compliance with RUSSIA code
J	JAPAN	E	DENMARK II	L	compliance with SLAVONIC code
U	U.K.	L	SLAVONIC		
F	FRANCE	R	RUSSIA		
S	SPAIN		reserved		

## 6.2 UTC standard mode command list

Command	Code description (hex)	Function description
BS	08	back space
HT	09	horizontal tab
LF	0A	line feed
CR	0D	carriage return
DLE	0F	display position
DC1	11	over write display mode
DC2	12	vertical scroll mode
DC3	13	cursor on
DC4	14	cursor off
ESC d	1B 64	change to UTC enhanced mode
US	1F	clear display

Table 6-4

## 6.3 UTC enhanced mode command list

Command	Code description (hex)	Function description
ESC u A ....CR	1B 75 41 [ data x 40]0D	upper line display
ESC u B ....CR	1B 75 42 [ data x 40]0D	bottom line display
ESC u D ....CR	1B 75 44 [ data x 40]0D	upper line message scroll continuously
ESC u E ....CR	1B 75 45 hh ‘:’ mm 0D h,m=‘0’-‘9’	display time
ESC u F ....CR	1B 75 46 [ data x 40]0D	upper line message scroll once pass
ESC u H ....CR	1B 75 48 n m 0D 20h<=n,m	change attention code

## ***CD5220 customer display***

ESC u I ....CR	1B 75 49 [ data x 40]0D	two line display
ESC RS CR	1B 0F 0D	change to UTC standard mode

Table 6-5

# ***CD5220 customer display***

## **6.4 AEDEX mode command list**

<b>Command</b>	<b>Code description (hex)</b>	<b>Function description</b>
! # 1 ....CR	21 23 31 [data x 40]0D	upper line display
! # 2 ....CR	21 23 32 [data x 40]0D	bottom line display
! # 4 ....CR	21 23 34 [data x 40]0D	upper line message scroll continuously
! # 5 ....CR	21 23 35 hh ':' mm 0D h,m='0'-'9'	display time
! # 6 ....CR	21 23 36 [data x 40]0D	upper line message scroll once pass
! # 8 ....CR	21 23 38 n m 0D 20h<=n,m	change attention code
! # 9 ....CR	21 23 39 [data x 40]0D	two line display

Table 6-6

## **6.5 ADM787/788 mode command list**

<b>Command</b>	<b>Code description (hex)</b>	<b>Function description</b>
CLR	0C	clear display
CR	0D	carriage return
SLE1	0E	clear up line and move cursor to upper line left most end
SLE2	0F	clear low line and move cursor to lower line left most end
DC0	10 n	set period to upper line last n position 31H<=n<=37H
DC1	11 n	set line blanking , n='1' up line, n='2' low line
DC2	12 n	clear line blanking , n='1' up line, n='2' low line
SF1	1E	clear field 1 and move cursor to field 1 fast position
SF2	1F	clear field 2 and move cursor to field 2 fast position

Table 6-7

# CD5220 customer display

## 6.6 DSP-800 mode command list

Command	Code description (hex)	Function descriptions
EOT SOH I n ETB	04 01 49 n 17	select international character set.
EOT SOH P n ETB	04 01 50 n 17 n=31-58	move cursor to specified position.
EOT SOH C n m ETB	04 01 43 n m 17 31<= n<=m<=58	clear display range from <u>n</u> position to <u>m</u> position and move cursor to <u>n</u> position.
EOT SOH S n ETB	04 01 53 n 17 n=31-35	save the current displaying data to <u>n</u> layer for demo display.
EOT SOH D n m ETB	04 01 44 n m 17 n=31-4F m=31-33	display the saved data
EOT SOH A n ETB	04 01 41 n 17 n=31-34	brightness adjustment.
EOT SOH F n ETB	04 01 46 n 17 00<=n<=FF	blink display screen.
EOT SOH & n [px5] ETB	04 01 26 n p1...p5 17, 20<=n	define download characters
EOT SOH ? n ETB	04 01 3F n 17 20<=n	delete download characters.
EOT SOH = n ETB	04 01 3D n 17 n='1','2'	select peripheral device. n='1',printer n='2',display
EOT SOH % ETB	04 01 25 17	initialize display
EOT SOH @ ETB	04 01 40 17	execute self-test

Table 6-8

(REMARK)\* About the command display the saved data(Table 6-9)

n	lay select	n	lay select	m	show mode
bit 0=1	lay 1	bit 3=1	lay 4	bit 0=1	show mode 1

## ***CD5220 customer display***

bit 1=1	lay 2	bit 4=0	lay 5	bit 1=1	show mode 2
bit 2=1	lay 3				

# **CD5220 customer display**

## **6. 7 EPSON Esc/pos command list**

<b>Command</b>	<b>Code description(hex)</b>	<b>Function description</b>
HT	09	move cursor right.
BS	08	move cursor left.
US LF	1F 0A	move cursor up.
LF	0A	move cursor down.
US CR	1F 0D	move cursor to right-most position.
CR	0D	move cursor to left-most position.
HOM	0B	move cursor to home position.
US B	1F 42	move cursor to bottom position.
US \$ x y	1F 24 x y x=1-20,y=01,02	move cursor to specified position.
CLR	0C	clear display screen.
CAN	18	clear cursor line.
US X n	1F 58 n 01<=n<=04	brightness adjustment.
US E n	1F 45 n      n=00-ff	blink display screen.
ESC @	1B 40	initialize display.
ESC t n	1B 74 n      n=00-0f	select character code table.
ESC R n	1B 52 n      n=00-0f	select international character set.
US r n	1F 72 n      n=00,01	select/cancel reverse character.
US MD1	1F 01	specify overwrite mode.
US MD2	1F 02	specify vertical scroll mode.
US MD3	1F 03	specify horizontal scroll mode.
ESC & s n m [a(p1..pa)]x m-n	1B 26 1 n m [a(p1..pa)]x m-n 20< n <=m<=ff a=1-5 p1..p5 =row1..row5	define download characters.
ESC ?	1B 3F	delete download characters.
ESC %	1B 25	select/cancel download character set.

# CD5220 customer display

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<b>Command</b>	<b>Code description(hex)</b>	<b>Function description</b>
ESC W n s x1 y1 x2 y2	1B 57 n s x1 y1 x2 y2 n=1,2,3,4 s=0,1	specify/cancel the window range. 1<=x1<=x2<=20 1<=y1<=y2<=2
ESC = n	1B 3D n n=1,31 ,select printer n=2,32 ,select display	select peripheral device.
US :	1F 3A	set starting/ending position of macro definition.
US ^ n m	1F 5E n m 00<=(n, m)<=ff	execute and quit macro.
US @	1F 40	execute self-test.
US T h m	1F 54 h m 0<=h<=17 , 0<=m<=3b	display time
US U	1F 55	display time continuously
ESC s 1	1F 73 01	store define download character to EEPROM
ESC d 1	1F 64 01	Restore user define character from EEPROM

11

Table 6-10

Set international font set for ESC/pos

Select code table for ESC/pos

n	International font	n	International font
0	U.S.A.	7	SPAIN
1	FRANCE	8	JAPAN
2	GERMANY	9	NORWAY
3	U.K.	10	DENMARK II
4	DENMARK I	11	SLAVONIC
5	SWEDEN	12	RUSSIA
6	ITALY	15	reserved

Table 6-11

n	International font set (80H-FFH)
0	Page 0,(PC437:U.S.A.,standard Europe)
1	Page 1,(Katakana for Japan )
2	Page 2,(PC850:multilingual)
3	Page 3,(PC860:Portuguese)
4	Page 4,(PC863:Canadian-French)
5	Page 5,(PC865:Nordic)
6	Page 6,(RUSSIA)
7	Page 7,(SLAVONIC)

Table 6-12

## ***CD5220 customer display***

### **7. INSTALLATION GUIDE**